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(54) Adaptor for a tracheal tube

(57) An adaptor for a tracheal tube is proposed, whose connecting piece (3) for external resuscitation tubes passes in funnel-shaped manner into an inwardly located connecting tube (1). The connecting tube is surrounded by a clamping ring (4) in the area where the tracheal tube (2) is mounted and its clamping members (8) engage in self-locking or automatically interlocking manner on the tracheal tube (2) and prevents same from slipping from the connecting tube (1).

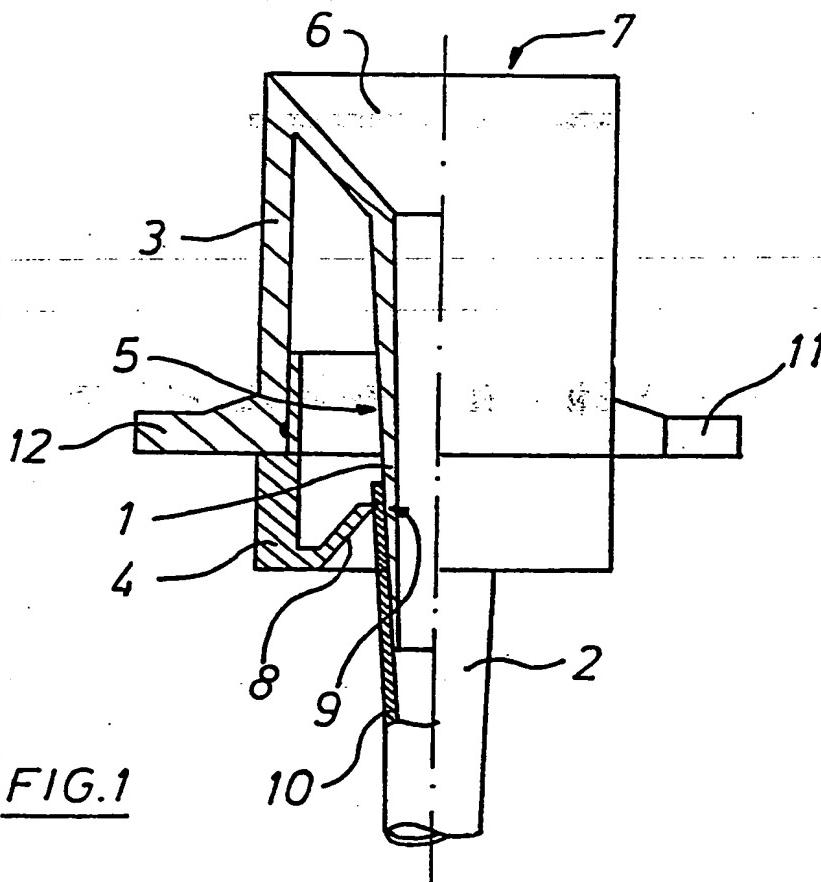
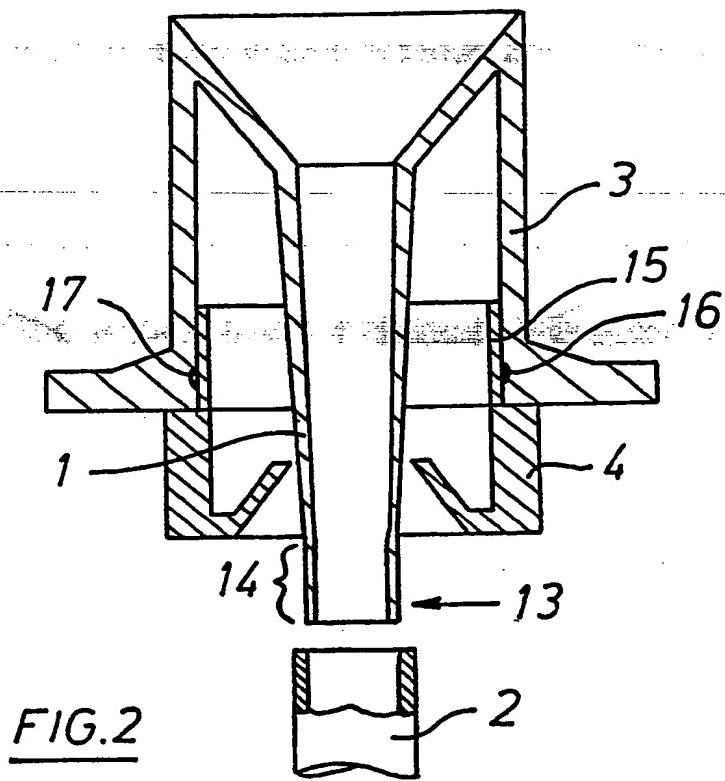
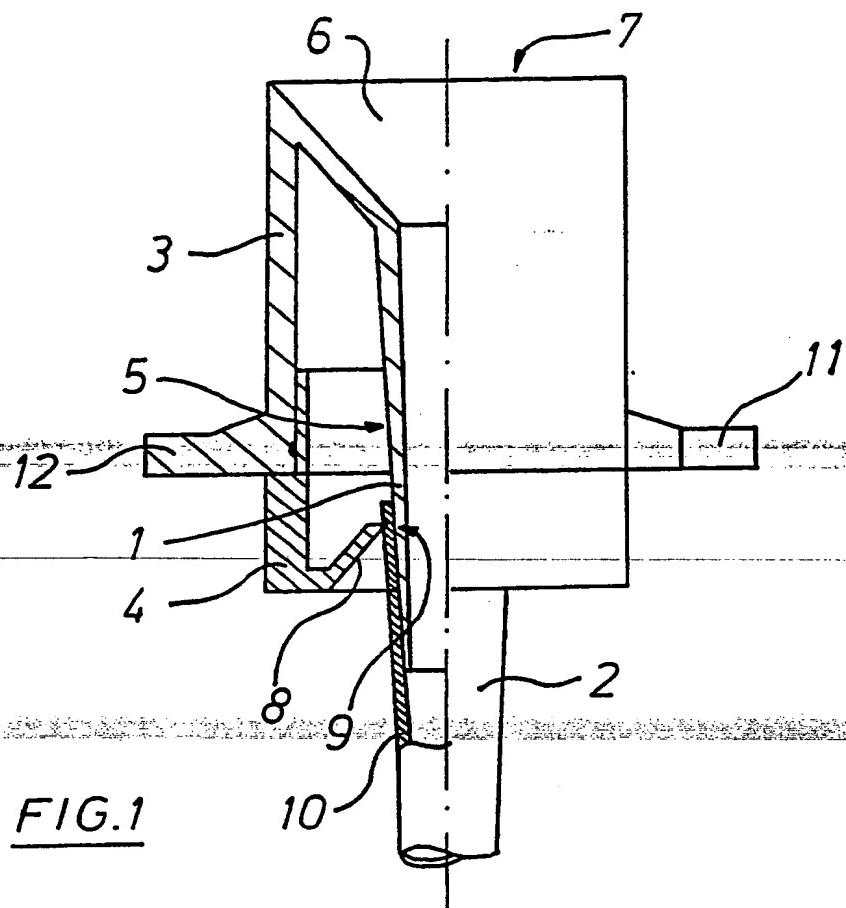


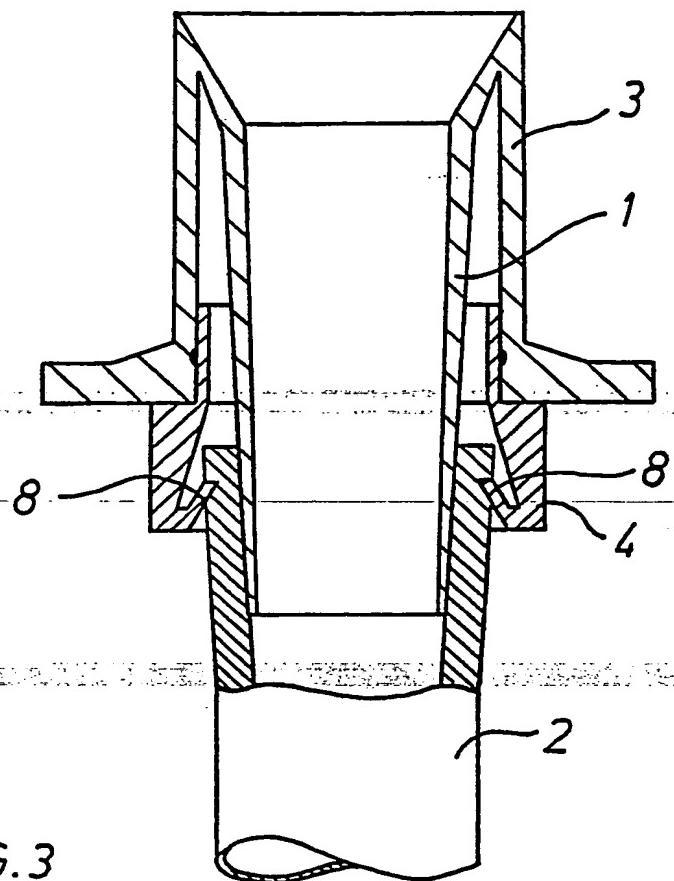
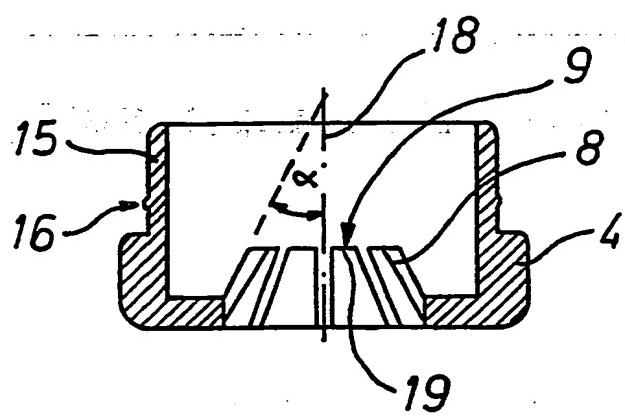
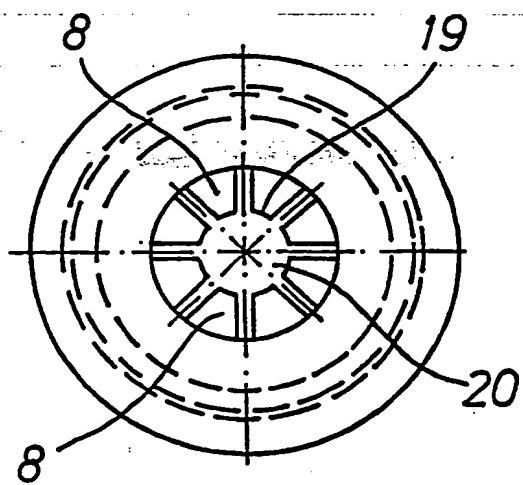
FIG.1

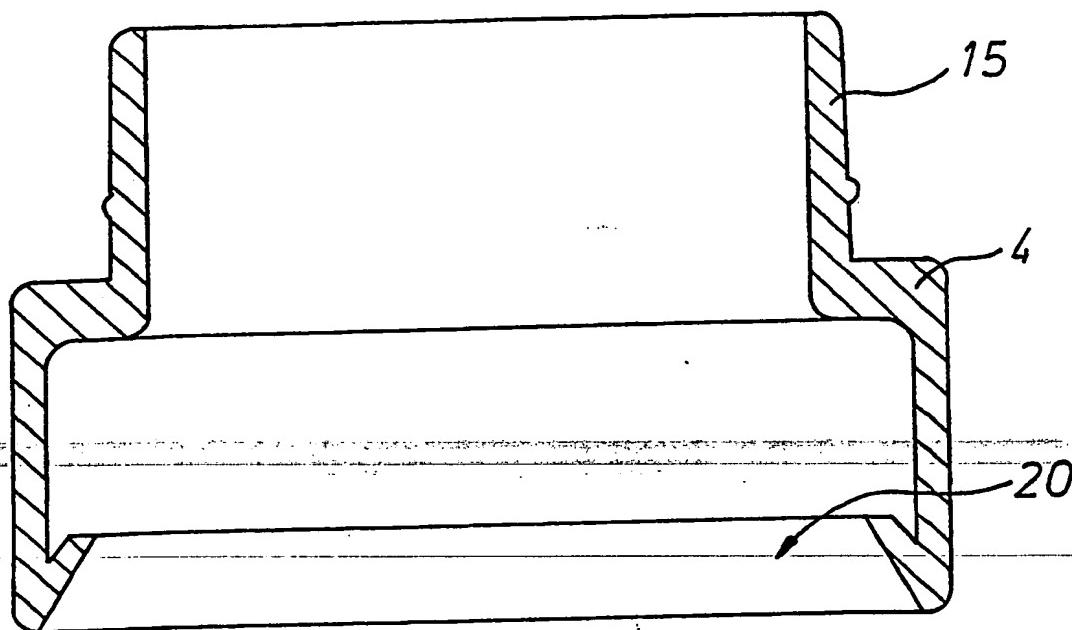
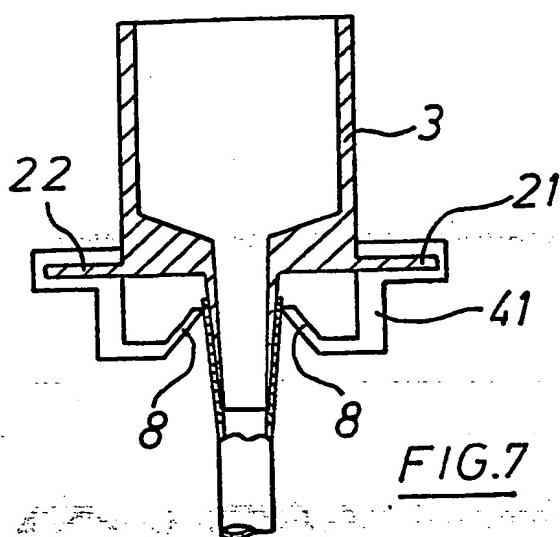
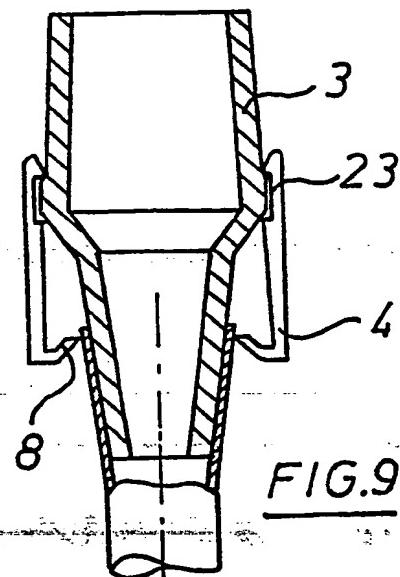
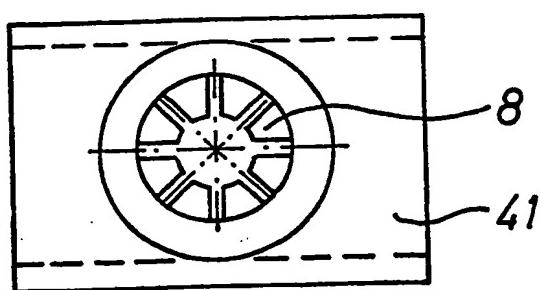
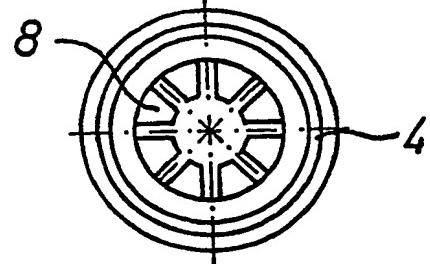
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FIG. 3FIG. 4FIG. 5

FIG. 6FIG. 7FIG. 9FIG. 8FIG. 10

ADAPTOR WITH TRACHEAL TUBE

The invention relates to an adaptor with a tracheal tube according to the preamble of claim 1.

For the resuscitation of patients endotracheal tubes are connected via an adaptor to the resuscitation tubes leading to resuscitors or respirators. Therefore the adaptors form the connecting piece between an individual adapted endotracheal tube and the resuscitation tubes. As a function of the patient, the internal diameter of the endotracheal tubes can vary between 2 and 10 mm. There is often also a need of not only adapting the endotracheal tube diameter to the patient, but also its length. Thus, prior to intubation, the treating doctor or surgeon often has to cut the endotracheal tube to a desired length and then connect it to the adaptor.

Adaptors are known having a connecting tube on which the endotracheal tube is engaged. This connecting tube passes into a connecting piece to which the resuscitation tubes are connected. The connecting piece generally has an internal diameter of at least 10 mm. The connecting tube can have a conical outer wall, which passes in a very flat or shallow manner towards the mouth. On pushing on the endotracheal tube, the latter widens in accordance with the conical configuration of the connecting tube. This is intended to provide a good grip of the endotracheal tube on the connecting tube. However, disconnection problems occur with these known adaptors. As a result of saliva and the heat present in the oral cavity, the already soft material endotracheal tube becomes so soft that it can be detached from the adaptor connecting tube. It is therefore necessary to constantly check the correct seating of the endotracheal tube, because otherwise there is a risk of disconnection between the tube and the adaptor.

The problem of the invention is to so further develop an adaptor in accordance with the preamble, that a tracheal tube fitted by pushing on to the adaptor connecting tube is reliably connected to the adaptor.

This problem is solved by the features given in claim 1. Through the use of at least one self-locking clamping member, which engages on the casing of the tracheal tube, a reliable connection between the tracheal tube and the adaptor is produced. On pushing on the tracheal tube the clamping member moves radially backwards, whereas on attempting to pull off the tracheal tube the clamping member or members engage in the tracheal tube wall.

Preferably the clamping members are in the form of clamping tongues directed at an acute angle inwards against the connecting tube and which on a clamping ring project inwards in spoke-like manner. Such a clamping ring can easily be produced as a plastic injection moulding with an extremely small material expenditure. The adaptor and the clamping ring can be made from the same plastics material.

The clamping ring can be particularly easily axially pushed over the connecting tube and connected to the adaptor, if interengaging locking elements are constructed on the adaptor and the clamping ring. Thus, in an adaptor pipe length can be provided a circular groove, in which engages a socket of the clamping ring with a locking ring. The clamping members of the clamping ring are arranged in such a way that at their tips they have a smaller spacing from the adaptor connecting tube than the tracheal tube wall thickness. As a result the locking members are always in engagement with the tracheal tube wall and secure same in self-locking or automatically locking manner against removal from the connecting tube.

From its projecting end, the connecting tube can have a conically widening external diameter, the connecting tube also being constructible in such a way that the outer wall is initially straight and only then passes into a conical configuration. The straight portion of the connecting tube can be very accurately adapted to the internal diameter of the tracheal tube to be connected and it is ensured that the tracheal tube can be very easily pushed over the straight portion without widening.

The transition from the connecting tube to the connecting piece for the resuscitation tubes preferably takes place by means of a funnel-shaped widening of the connecting tube, which terminates at the opening edge of the connecting piece. This means that the internal

diameter of the connecting piece tapers directly from the opening in funnel-shaped manner to the connecting tube within the connecting piece. This prevents undesired "dead spaces", so that optimum resuscitation or respiration is possible.

The invention is described in greater detail hereinafter relative to non-limitative embodiments and the attached drawings, wherein show:

- Fig. 1 An inventive adaptor with a fitted tracheal tube.
Fig. 2 An adaptor with a partly straight connecting tube for the tracheal tube.
Fig. 3 An adaptor with tracheal tube having a large internal diameter.
Fig. 4 The cross-section through a clamping ring.
Fig. 5 The front view of the clamping ring of Fig. 4.
Fig. 6 A cross-section through a clamping ring for very large diameter tracheal tubes.
Fig. 7 Another construction with a rectangular clamping part mounted on the connecting piece and in cross-section.
Fig. 8 A front view of the clamping part of Fig. 7.
Fig. 9 Another embodiment with a clamping ring engaging over the connecting piece in cross-section.
Fig. 10 The front view of the clamping ring of Fig. 9.

The adaptor shown in Fig. 1 comprises a connecting tube 1, onto which is pushed a tracheal tube 2 and comprising a connecting piece 3 for fitting the here not shown resuscitation tubes and a clamping ring 4.

The connecting tube 1 has a conically widening outer wall and passes in the form of a funnel 6 to the diameter of the connecting piece 3.

The funnel opening 7 simultaneously forms the connecting opening of the connecting piece 3.

The clamping ring 4 has inwardly directed clamping tongues 8, which engage with their tip 9 in the wall 10 of the tracheal tube 2.

The construction of the clamping rings 4 is made clearer in Figs. 4 and 5. Two fastening tongues 11, 12 project laterally from the adaptor and to which can be fixed in the conventional manner a fastening band.

Fig. 2 shows an adaptor construction in cross-section, in which on its projecting end 13 the connecting tube 1 has a straight tube

portion 14, which then passes into the conical configuration of the connecting tube 1. The external diameter of the straight tube portion 14 can be accurately adapted to the internal diameter of the not widened tracheal tube 2.

As in the embodiment according to Fig. 1, the clamping ring 4 is engaged on the adaptor in such a way that a socket 15 shaped on to the clamping ring 4 engages in the connecting piece 3. Onto the socket 15 is shaped an all-round locking ring 16, which engages in a corresponding circular groove 17 of the connecting piece 3.
Fig. 3 shows a construction with a much larger connecting tube diameter. However, the function of the individual elements corresponds entirely to those of Figs. 1 and 2.

The clamping ring 4 shown in Fig. 4 has several inwardly directed clamping members 8, which are at an acute inclination angle to the central axis 18. The clamping members 8 are constructed as radially elastically resilient clamping tongues. The tips 9 of the clamping tongues form narrow, tapering locking edges 19, which segmentally surround an annular space 20 as shown in Fig. 5. As can be gathered from Fig. 1 to 3, the connecting tube 1 projects through the annular space 20. The shaped locking ring 16 passes round the socket 15. The adaptor, including the mounted clamping ring 4, is preferably made from plastic and the clamping ring 4 can be made from a plastics material giving the clamping members 8 the necessary elasticity and stability.

Fig. 6 is a much larger scale representation of a clamping ring 4 for particularly large tracheal tubes. The diameter of the annular space 20 is here larger than the internal diameter of the socket 15.

Figs. 7 to 10 show further embodiments, in which the embodiment of Fig. 7 has a rectangular clamping part 41, which engages over the connecting piece 3 at tongues 21, 22. The clamping ring 4 of Fig. 10 engages over the connecting piece 3 on a rim 23 passing round in circular manner.

C L A I M S

1. Adaptor with tracheal tube, which on the one hand has a connecting tube which can be inserted in the tracheal tube and on the other hand a connecting piece for the connection of resuscitation tubes, characterized in that on the part of the tracheal tube (2) located on the connecting tube (1) presses from the outside at least one clamping member (8) which yields on mounting the tracheal tube (2) and which secures the latter in self-locking or automatically interlocking manner against removal from the connecting tube (1) and that prior to the pushing on of the tracheal tube (2), the clamping members (8) have a smaller radial spacing from the connecting tube (1) than the wall thickness of the tracheal tube (2) to be pushed on.
2. Adaptor according to claim 1, characterized in that a clamping ring (4) with several clamping members (8) constructed as clamping tongues and directed at an acute angle inwards against the connecting tube (1) engage over the latter.
3. Adaptor according to claim 2, characterized in that the clamping ring (4) can be axially pushed onto the connecting tube (1) and is connectable to the adaptor in an end position.
4. Adaptor according to claim 3, characterized in that in the end position the clamping ring (4) locks on the adaptor.
5. Adaptor according to one of the preceding claims, characterized in that, as from its projecting end (13), the connecting tube (1) passes into an outwardly conically widening tube portion.
6. Adaptor according to one of the claims 1 to 4, characterized in that, as from its projecting end (13), the connecting tube (1) initially has a parallel front wall and then passes into a conically widening tube portion.
7. Adaptor according to one of the preceding claims, characterized in that the clamping members (8) segmentally surround an annular space (20) through which projects the connecting tube (1).

8. Adaptor according to one of the preceding claims, characterized in that the opening of the connecting piece (3) passes in funnel-shaped manner to the connecting tube (1) located within the connecting piece (3).
9. An adaptor for a tracheal tube substantially as hereinbefore described with reference to, and as shown in, Figs. 1 and 2, or Fig. 3, or Figs. 7 and 8, or Figs. 9 and 10, of the accompanying drawings.
10. An adaptor as claimed in claim 9, modified substantially as hereinbefore described with reference to, and as shown in, Figs. 4 and 5 or Fig. 6 of the accompanying drawings.
11. An adaptor as claimed in any one of claims 1 to 10, in combination with a tracheal tube.
12. A connecting piece for forming part of an adaptor as claimed in any one of claims 1 to 8.
13. A connecting piece substantially as hereinbefore described with reference to, and as shown in, Figs. 1 and 2, or Fig. 3, or Fig. 7, or Fig. 9 of the accompanying drawings.
14. A locking ring for forming part of an adaptor as claimed in any one of claims 1 to 8.
15. A locking ring substantially as hereinbefore described with reference to, and as shown in, Figs. 1 and 2, or Fig. 3, or Figs. 4 and 5, or Fig. 6, or Figs. 7 and 8, or Figs. 9 and 10, of the accompanying drawings.

Relevant Technical fields	Search Examiner
(i) UK CI (Edition K) F2G (G24A1; G24Z)	
(ii) Int CI (Edition 5) A51M 16/00; F16L 21/08, 21/06	B J PROCTOR
Databases (see over)	Date of Search
(i) UK Patent Office	
(ii)	6 MARCH 1992

Documents considered relevant following a search in respect of claims

1 AT LEAST

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2199630 A (PORTER) Eg Figure 5	1-4, 7 at least
X	GB 2049087 A (ERICSON) Eg teeth 14	1-4, at least
X	GB 1457892 A (GRIFFITHS) Eg Figure 4	1 & 5 at least
X	GB 718411 A (JOHNSON) Eg Figure 7a	1 & 5 at least
X	GB 663539 A (FISKER) Eg Figure 1	1-4 at least

Category	Identity of document and relevant passages	Relevant to claim(s)

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